

1.933
P872
Cop 2

PWR 300
ENG 197

24
U.S. UNITED STATES DEPARTMENT OF AGRICULTURE
RURAL ELECTRIFICATION ADMINISTRATION
5a WASHINGTON 25, D. C.

June 8, 1950

REC'D
1/3

POWER MEMORANDUM 300

ENGINEERING MEMORANDUM 197

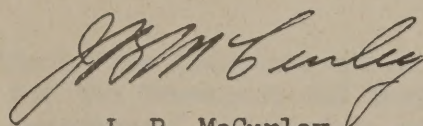
1.933
En 3

SUBJECT: Transmission Line Wood Cross Arm and Cross Arm
Brace Specifications

The attached specifications were accepted by the Technical Standards Committee to apply to transmission line wood cross arms and cross arm braces.

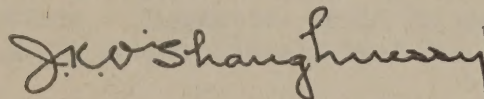
It is the responsibility of the borrower's engineer to see that all wood cross arms and cross arm braces, to be purchased for use on REA-financed transmission systems, conform to these specifications.

This memorandum applies to all power-type borrowers.



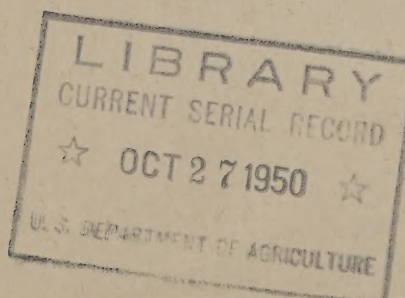
J. B. McCurley
Chief, Power Division

This memorandum applies to all distribution-type borrowers.



J. K. O'Shaughnessy
Chief, Engineering Division

Attachment



UNITED STATES DEPARTMENT OF AGRICULTURE
Rural Electrification Administration
Washington 25, D.C.

TRANSMISSION LINE WOOD CROSSARM AND CROSSARM BRACE SPECIFICATIONS

Scope: These specifications apply to the inspection and treatment of Douglas Fir and Southern Pine transmission line wood crossarms and braces purchased by REA borrowers.

General: Where there is a conflict between these specifications and other specifications referred to herein, these specifications shall govern, except Engineering Memorandum No. 133R2 or latest revision shall govern with regard to over-all stipulations, treatment and inspection.

No wood for transmission line wood crossarms or crossarm braces shall be incised for treatment.

General Specifications Covering All Transmission Wood Crossarms:

1. Workmanship: All crossarms shall be of first quality workmanship. The crossarms shall be surfaced on all four sides after being seasoned.
2. Marking: All crossarms shall be legibly and permanently marked or branded with manufacturer's designation, year of manufacture and code indicating treatment given. The crossarms shall be branded in such a manner as to designate the best side of the crossarms as the top of the arm.
3. Chamferring: Transmission crossarms shall not be chamferred or rounded unless specified on individual orders.
4. Dimensions and Tolerances: The dimensions and tolerances of the crossarms supplied shall conform with those on drawings that accompany this specification.
5. Treatment: Douglas Fir and Southern Pine Crossarms shall be treated as indicated in "Specifications for the Treatment and Inspection of Treated Timber Purchased by REA Borrowers," referred to as Engineering Memorandum No. 133R2 or subsequent revisions thereof.
6. Inspection: All crossarms must be inspected in accordance with Engineering Memorandum No. 133R2 or subsequent revision thereof and the provisions of these specifications. Inspection shall be made at the treating plant and the inspector shall assure himself that the treating

process is being carried on as specified. The supplier shall give to the purchaser or his representative such access to his works during working hours as is reasonable and necessary to determine the suitability of material to be supplied and shall furnish all necessary apparatus, labor and other facilities herein called for without cost to the purchaser. The supplier shall eliminate all crossarms that he considers defective according to these specifications before offering any lot for inspection. Inspection by the purchaser's representative shall not relieve the supplier from the obligation to furnish material in accordance with these specifications.

7. Rejection: All crossarms not meeting requirements of these specifications shall be rejected.
8. Storage: Untreated crossarms held for storage shall be stacked in cross piles on skids in such a manner as to insure good ventilation. The stacks shall be suitably covered to prevent the penetration of rain or the direct action of the sun.

Detail Specifications for Douglas Fir Crossarms:

1. General: All crossarms shall be made of sound, coast type Douglas Fir (*Pseudotsuga Taxifolia*) timber, in accordance with the requirements of paragraph 202 for "Select Structural Framing, Joists, Plank and Small Timber" or paragraph 212 for "Select Structural Beams and Stringers," as indicated in the West Coast Lumbermen's Association Publication No. 14, entitled, "Grading and Dressing Rules for Douglas Fir," dated July 1, 1947, and with additional limitations as specified below.

2. Seasoning:

Moisture content required

Air dried or kiln dried -- Average 12% to 20% of oven dry weight. The average moisture gradient shall not exceed 5% from center to surface.

3. Prohibited Defects:

Checks: Through checks are prohibited.

Compression Wood: Prohibited.

Cracks (Cross Breaks): Prohibited.

Decay (Dote or Rot): Prohibited.

Lightweight of Brashy Wood: Prohibited.

Pitch Seams: Prohibited.

Pith Centers (Boxed heart or heart centers): Prohibited.

Shakes: Prohibited.

Splits: Prohibited.

Worm Holes (Insect Damage): Prohibited.

4. Limited Defects:

Warp: The maximum warp shall not exceed 1/10 inch in 12-inch length but not in two directions.

Knots: Knots intersecting pin or bolt holes in the arm shall not exceed 1/2 inch in diameter.

Detail Specifications for Southern Pine Crossarms:

1. General: All crossarms shall be made of "Dense Structural Timber" in accordance with the requirements of paragraph 314 for "Joists and Planks" or paragraph 315 for "Beams and Stringers" of the 1948 "Standard Grading Rules for Southern Pine Lumber," Southern Pine Inspection Bureau of the Southern Pine Association and with additional limitations as specified below:

2. Seasoning:

Moisture content permitted:

Air dried or kiln dried -- Not more than 20% of oven dry weight.

3. Prohibited Defects:

Checks: Through checks are prohibited.

Compression Wood: Prohibited.

Cracks (Cross Breaks): Prohibited.

Decay (Rot and Dote): Prohibited.

Red Heart: Prohibited.

Pith Centers (Boxed heart or heart centers): Prohibited.

Shakes: Prohibited.

Splits: Prohibited.

Worm Holes (insect damage): Prohibited.

4. Limited Defects:

Season checks: Seasoning checks are acceptable if not deeper than 1/4 thickness of piece when not opposite each other; if opposite, the combination shall not exceed 1/4 thickness of piece. Maximum allowable width of any check - 1/16 inch.

Pitch pocket: Maximum 1/8 inch in width and not more than 8 inches in length.

Warp: Shall not exceed 1/10 inch in 12-inch length. No crossarm shall be twisted or bent in more than one direction.

Knots: Intersecting pin or bolt holes shall not exceed 1/2 inch diameter.

Cross Grain: Grain which departs from parallelism with the axis of the crossarm not to exceed 1 inch in length of 15 inches is permitted.

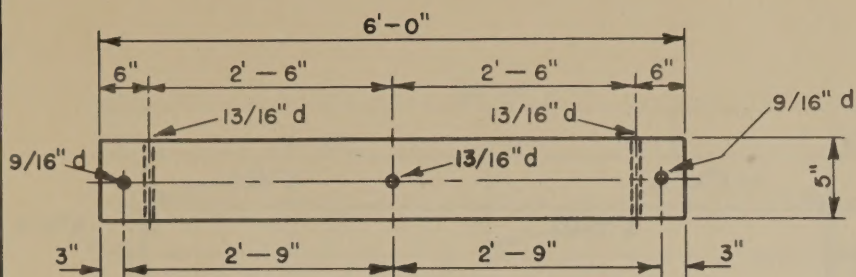
Specifications for Wood Crossarm Braces:

1. General: Braces shall be furnished assembled (one brace consisting of two pieces). The assembled arm and brace shall be capable of withstanding without appreciable deflection, a vertical load of 500 pounds applied at one end of a ten-foot arm attached to the pole at the center.
2. Material: Braces may be made of "Dense Select Structural Douglas Fir," "Dense Select Structural Pine" or acceptable equivalent when approved by REA. Each wood part shall be kiln dried or air seasoned, free from all defect except:
 - (a) One surface check, not over $1/32$ inch wide and not over 4 inches long.
 - (b) Two sound knots not over $1/2$ inch in diameter; or
 - (c) One pitch pocket not over $1/8$ inch wide by 4 inches long, or not over $1/4$ inch wide by 2 inches long.

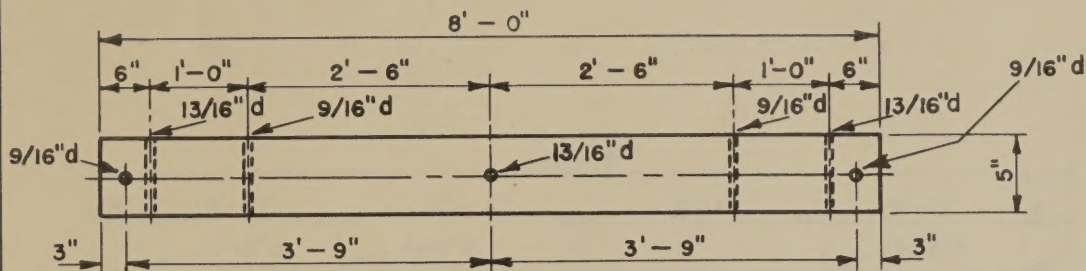
The slope of grain shall not exceed one inch in each twenty inches of length.

All metal parts shall be furnished in accordance with ASTM specifications A7-46 or any acceptable revision thereof. All metal parts shall be hot dip galvanized in accordance with ASTM specification A153-47T or the latest revision thereof.

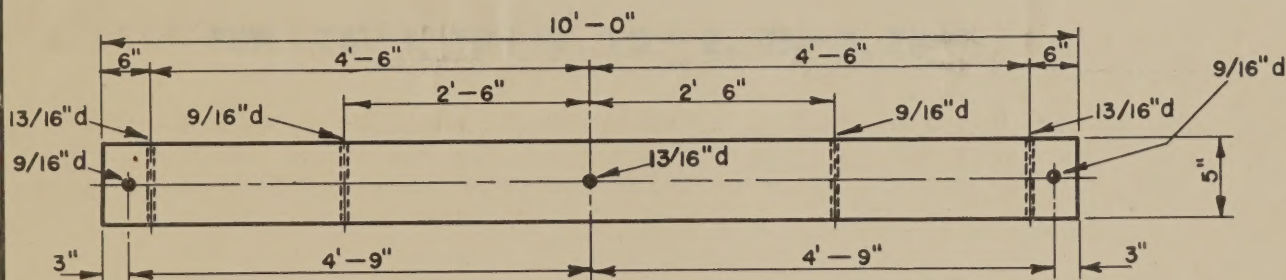
3. Dimensions: Douglas Fir and Southern Yellow Pine braces shall be a minimum of $1\frac{1}{2}$ inches by $2\frac{1}{2}$ inches in cross section.
4. Treatment: All wood used in crossarm braces shall be treated as indicated for crossarms in "Specifications for the Treatment and Inspection of Treated Timber Purchased by REA Borrowers," referred to as Engineering Memorandum No. 133R2 or subsequent revisions thereof.
5. Inspection: All crossarm braces shall be subject to inspection of the wood in the same manner as specified for inspection of wood crossarms.



FOR TP-5



FOR TP-1, TP-2, TP-3, TP-4, TP-5, TP-6



FOR TP-6

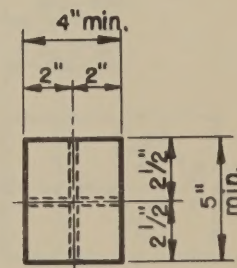
NOTE:

Drill all holes on center lines.

"d" denotes hole diameter.

Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	0.0"



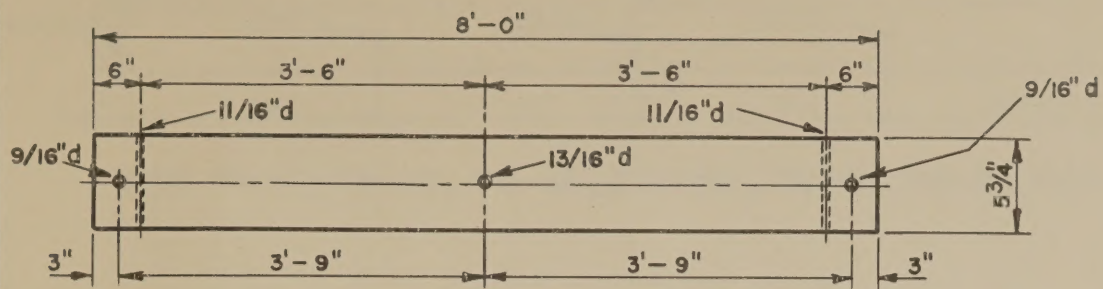
ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE
FOR PIN TYPE STRUCTURES

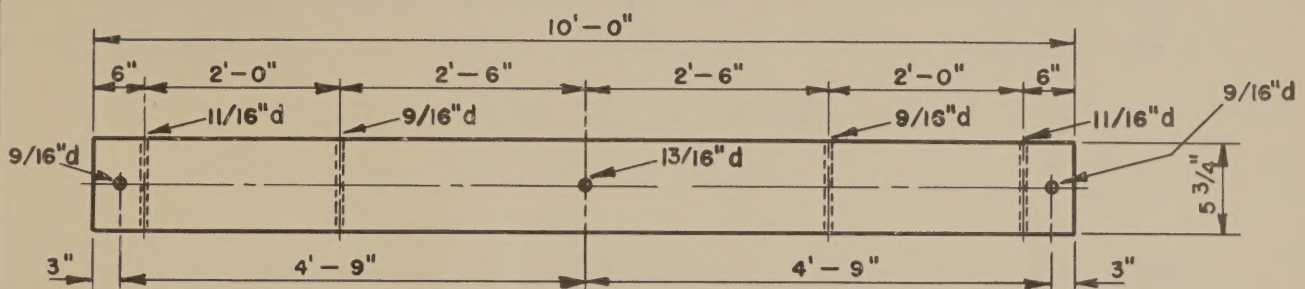
Scale: None

Date: 11-49

TM-20



FOR TS-1, TS-1B, TS-2, TS-6



FOR TS-1, TS-1B, TS-2, TS-6, TS-7

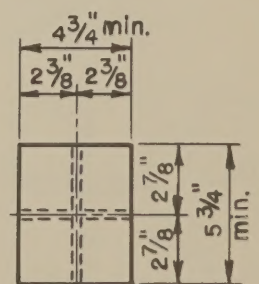
NOTE:

Drill all holes on center lines.

"d" denotes hole diameter.

Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	0.0"



ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE
FOR SINGLE POLE SUSPENSION STRUCTURES

Scale: None

Date: 11-49

TM-21

FOR THE YEAR 1912

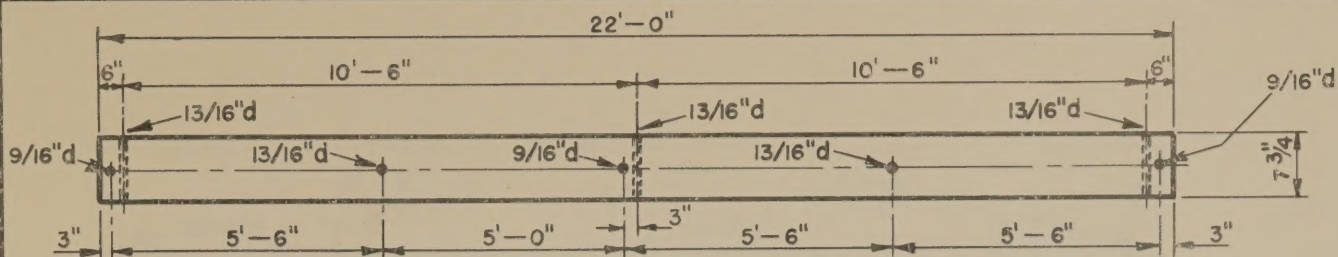
THE YEAR 1912

THE YEAR 1912

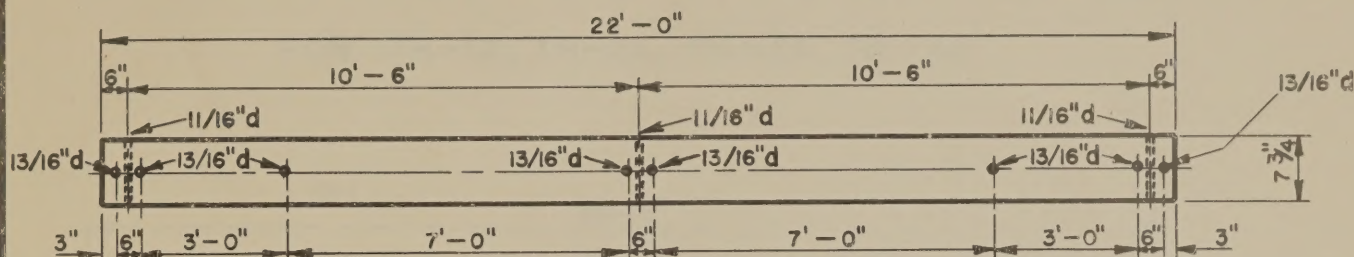
THE YEAR 1912

THE YEAR 1912

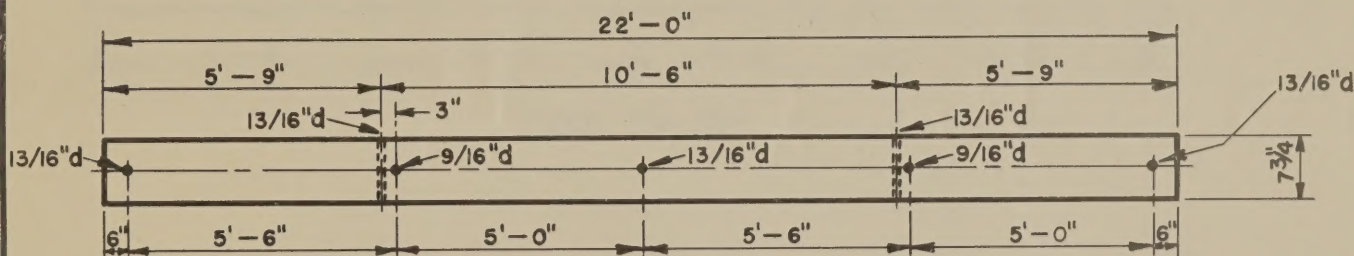
THE YEAR 1912



FOR TH-1, TH-1G, TH-1B, TH-1BG, TH-6, TH-3, TH-4



FOR TH-2, TH-2G



FOR TH-5

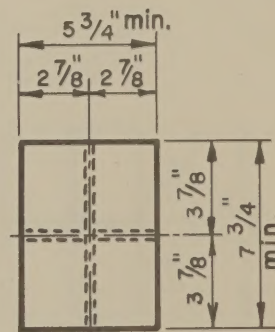
NOTE:

Drill all holes on center lines.

"d" denotes hole diameter.

Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	0.0"



ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE
FOR H-FRAME STRUCTURES WITH 10'-6" CONDUCTOR SPACING

Scale: None

Date: 11-49

TM-22

THE UNIVERSITY OF CHICAGO

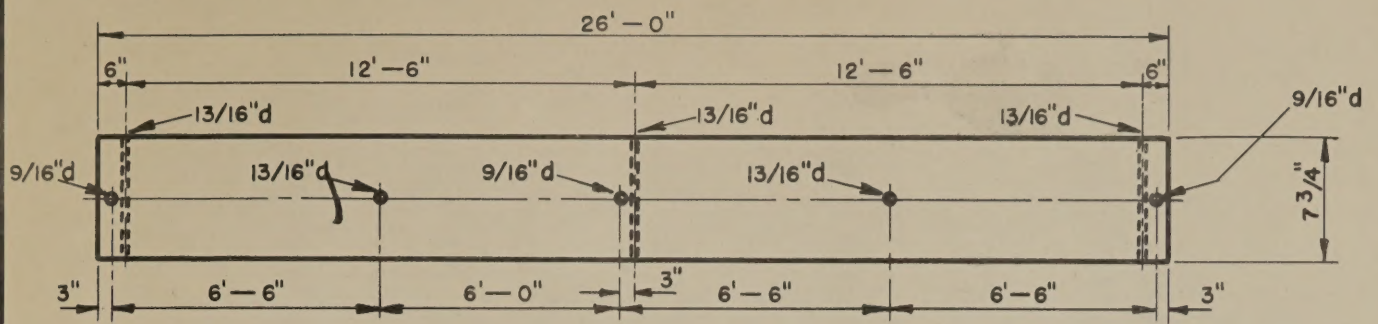
THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

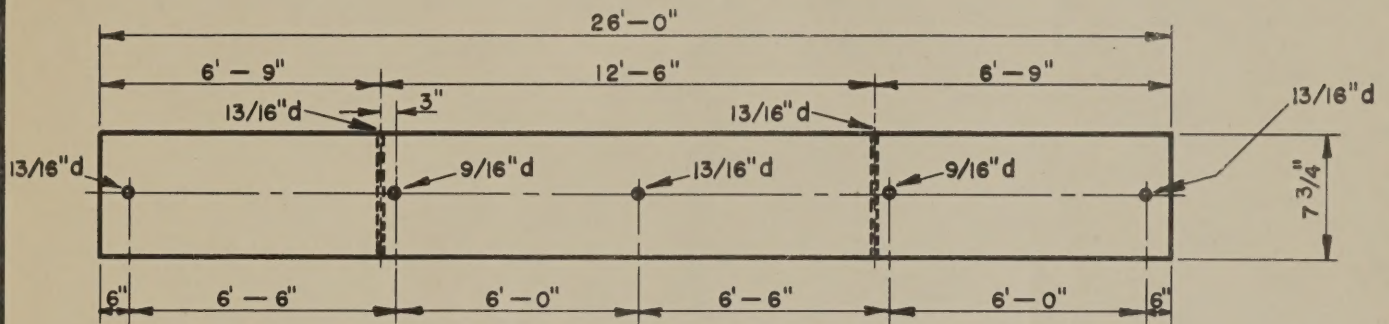
THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO

THE UNIVERSITY OF CHICAGO



FOR TH-1A, TH-2A, TH-3A, TH-4A



FOR TH-5A

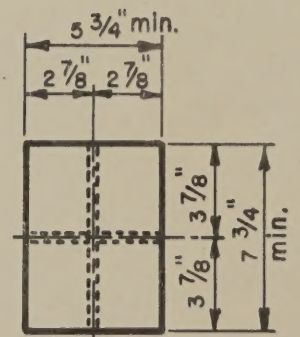
NOTE:

Drill all holes on center lines.

"d" denotes hole diameter.

Holes shall be drilled before treating.

TOLERANCES:	Over	Under
Length	1/4"	1/4"
Cross Section	1/8"	0.0"



ENLARGED END VIEW
Surface Finished Dimensions

CROSSARM DRILLING GUIDE
FOR H-FRAME STRUCTURES WITH 12'-6" CONDUCTOR SPACING

Scale: None

Date: 11-49

TM-23

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

RECEIVED

1954

RECEIVED

CHICAGO, ILL.

CHICAGO, ILL.

RECEIVED